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ABSTRACT

Recent discoveries about the whole brain seem to call for a holistic approach to learning, one in which educators would teach the whole person, including physical and emotional states as well as cognitive abilities. Three holistic techniques are particularly relevant to education: (1) biofeedback; (2) yoga; and (3) the Lozanov method. Biofeedback can help students enhance their concentration powers; yoga can help students achieve a relaxed yet concentrated state, and the Lozanov method of "suggestology" uses background music and softly spoken information to create a state of physical relaxation and mental alertness whereby a student can absorb information at a much higher rate than is otherwise possible. Using the American version of the Lozanov method, the Suggestive-Accelerative Learning and Teaching (SALT) approach, learning disabled students in Dekalb, Georgia, made impressive gains in oral and silent reading; affective results were equally impressive. A second experiment in Iowa also produced gains, especially in affective areas. These studies indicate that holistic education has the potential to become a great learning force in the future. (JL)

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Left Brain, Right Brain, Super Brain: The Holistic Model

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Left Brain, Right Brain, Super Brain: The Holistic Model

Learning to read and write is a highly complex, cognitive process; yet too often literacy instruction treats it simplistically by emphasizing visual/psychomotor skill learning to the exclusion of thought development. Despite nearly three decades of research into cognitive processes which has yielded a plethora of information about how we learn (Russell, 1959; Hyden, 1969; Dalby and Gibson, 1981), classroom application lags seriously behind theory. Recently, research in metacognition, or how learning is regulated by the individual, suggests that knowledge of specific cognitive processes can aid teachers in improving the cognitive performance of students (Guthrie, 1982). How such improvement might take place through a holistic approach to education is the subject of this paper.

Hemispheric Brain Research

Most of what we know about the functions of the brain comes from neurological reports of brain injured persons. The specific portion of the brain most studied during these medical operations is the cerebral cortex. The cerebral cortex in turn is divided into twin hemispheres (a left and a right) which are joined by the corpus callosum, a bundle of interconnecting fibers. It is the hemispheric or lateral specialization of the brain which is unique to human beings and accounts in part for our unique evolutionary development of language (Ornstein, 1977). The notion of lateral specialization has been the subject both of extensive study and much controversy. From the study has resulted the following dichotomous description of the hemispheric functions:

Left Hemisphere of Brain	Right Hemisphere of Brain
Analytic reasoning	Synthetic reasoning
Logical thought	Intuitive reasoning

Left Hemisphere of Brain	Right Hemisphere of Brain
Verbal skills	Spatial orientation
Math skills	Artistic endeavors; crafts
Linear operations	Part-Whole relationships
Sequential processing	Diffuse processing
Phonics, syntax, semantics	Visual, spatial, emotional
Sequential ordering	Holistic, relational
Mediated intellect	Patterned, intuitive intellect

(Ornstein, 1977)

From an analysis of the above we might conclude as have others that schooling is a left brain environment trying to educate right brain kids. With its emphasis on linear, verbal, cause and effect learning, our school system and our society as a whole often ignore or penalize the spatially and imaginatively oriented individual.

The controversy in brain research arises from more recent evidence that challenges this notion of absolute hemispheric specialization. Work done by Roger Sperry, the 1982 Nobel Prize Winner in Medicine, has shown that when one hemisphere is damaged, the other hemisphere can be taught those skills and tasks previously thought to be fixed in a single hemisphere (Time, 1981). Dennis and Whitaker (1977) found that in left hemispheric damaged patients the right hemisphere often assumes many linguistic functions. That the right hemisphere is involved with many para linguistic facets of language has also been demonstrated by the research of Zaidel (1976) and Wapner, Hamby and Gardner (1981). Thus the once commonly accepted notion of a major or dominant (left) brain must now give way to a more whole brain orientation.

Though hemispheric specialization may still be a relevant topic for discussion the notion of teaching to the whole brain is now gaining more credence among educators. It still remains however for educators to take still one

more giant step and view learning in terms of the whole person including physical and emotional states as well as cognitive abilities. Such an approach would be termed holistic. The holistic model builds on what Bob Samples called the metaphoric mind or what Abraham Maslow labeled the state of transcendence. Yet in an era when a back-to-the-basics mentality pervades schooling, the holistic approach to learning, simply because it is different, is finding widespread acceptance difficult to achieve.

One of the difficulties with the holistic model relates to the concept of mind set regarding what is possible. Jerome Bruner often noted that we experience that which we expect to occur. For example, most human beings possess a set of shared concepts of what they believe to be possible or correct. Grouping or categorizing such ideas is the way we both perceive the world and learn about it. But this same system is also what limits the scope of our inquiry. Just as we once assumed certain fixed physical limitations, such as the ability of a person to run the mile in less than four minutes, we must now confront the believed mental limitations of man. A single example shall suffice. There are documented accounts of people who, through the power of their minds, can actually lower their body temperature, reduce their heart beat, slow the circulation of their blood and consciously alter the brain wave patterns in their head. Such involuntary functions were previously thought to be beyond the conscious control of man. This willingness to go beyond the currently accepted limitations of learning is also what the holistic approach is about.

Mind/Body Interaction

Research into the area of mind/body interaction has received scant attention in America, with the most notable exception occurring in the area of sports, where professional athletes in football, baseball, tennis and golf

have reported increased proficiency of performance through the practice of various holistic techniques. It is now time for the academic community to examine the potential of these holistic approaches for improving learning in the schools. Three holistic techniques in particular appear relevant to education. They are (1) Biofeedback, (2) Yoga, and (3) the Lozanov Method.

The term Biofeedback is used to encompass a variety of similar techniques, all of which provide the individual with information regarding his/her internal state at a particular time. Birk (Stern and Ray, 1977) defines biofeedback ". . . as the use of monitoring instruments (usually electrical) to detect and amplify internal physiological processes within the body, in order to make this ordinarily unavailable information available to the individual and literally to feed it back to him in some form (p. 5)." The instruments used in Biofeedback training make it possible for the individual to tune in to and utilize the rhythmic movements of the body such as the blood pulse, heart beat, and brain waves. Researchers at Rockefeller Institute and Harvard have already successfully used Biofeedback techniques to treat patients with high blood pressure and hypertension, a major cause of heart attacks (Ornstein, 1977). Other researchers have used Biofeedback techniques to successfully treat asthma, migraine headaches, stomach and intestinal disorders (Stern and Ray, 1977). The medical profession is thus far ahead of its colleagues in education in making use of this valuable technique.

The work that has been done involving Biofeedback in learning experiments generally concentrates on teaching the subjects to control their brain wave patterns to enhance concentration powers. How is this done? We know that within the brain electrical impulses or waves are emitted in periodic patterns which are measured in Hertz (Hz) or cycles. Theta waves measure from 4 to 7

Hz and are the slowest. Alpha waves (8 to 12 Hz) are characterized as slow but with high amplitude. High frequency low amplitude waves (13-25 Hz) are called Beta. By attaching electrodes to a person's scalp, scientists are able to reproduce this electrical activity of the brain as a visual display on a small screen. A subject can thus actually see his/her brain waves (the feedback), then consciously learn to control them and induce a desired brain wave pattern, such as alpha waves, for example, which occur when a person is quiet, relaxed and yet aware of his/her surroundings, the optimal condition for learning. Though the alpha state can and has been learned by subjects in experimental settings, it is important as Biofeedback researcher Eric Peper reminds us that "Biofeedback learning implies self-control so that the person is responsible for his own growth. No one can make you control yourself. Hence there is a change in the source of responsibility--the responsibility rests with the subject. . ." (Peper, 1979, 112-113).

Ornstein and Galen (Ornstein, 1977) have studied brain wave patterns in learning experiments in which they noted that "an increase in alpha rhythms appears in the hemisphere less involved in the task" (p. 207). That is, during the processing of verbal information (a primarily left brain function) there is an increase in the alpha waves of the right hemisphere. During spatial information processing (a primarily right hemisphere activity), alpha waves increase in the left hemisphere. Half of the brain thus appears to rest or relax when not involved in learning. Ornstein like Peper believes that by providing brain wave information to students they may learn to alter their mental states to more efficiently process different kinds of information.

Yoga Learning Techniques

As with Biofeedback techniques, Yoga has already been adopted by many members of the American medical and health professions as a means of con-

trolling weight, treating insomnia, headaches, and heart conditions. Primarily it is recommended as a healthful means of preventing such conditions in the first place. Furthermore, practitioners of Yoga report not only physical well being but improved intellectual capacity as well. The world renowned violinist, Yehudi Menuhim, for example, considers Yoga to be a central part of his creative achievements. Like other holistic approaches, the success of Yoga, according to one author ". . . lies in the fact that it deals with the entire man, not with just one of his aspects" (Devi, 1971, p. xxi-xxii).

Educators in America have generally been reticent about recognizing the potential of Yoga for the classroom. This is primarily because it has often been misunderstood and consequently rejected as Oriental kook religion suitable only for rock musicians and potheads. Nothing could be further from the truth. First, Yoga is not a religion; you can be Catholic, Protestant, Jewish or Buddhist and still practice Yoga. It is more closely akin to a philosophy of life that calls for complete harmony among mind, body and nature, achieved through various exercises, body postures (called asanas), deep breathing techniques, and meditation. The main purpose of the exercises, deep breathing, etc. is to increase the healthy circulation of blood and air throughout the body. As the circulatory or bodily rhythms improve, a concurrent relaxed state of mind, amenable to increased learning, is achieved. It is this relaxed yet concentrated state that can be utilized in the classroom as a vehicle for enhanced learning.

Gay Hendricks in his two popular books The Centering Book (Hendricks and Wills, 1975) and The Second Centering Book (Hendricks and Roberts, 1977) incorporates the exercises and principles of Yoga as a means of helping young children achieve a relaxed state in which the mind and body are centered or balanced in a holistically integrated fashion. In this relaxed state, Hen-

dricks contends, children will exhibit maximum cognitive and creative powers. Hendricks recommends that teachers spend about 15-20 minutes each day taking their children through a variety of specific exercises and breathing techniques. Some of these psychophysical centering techniques include:

1. Tensing then relaxing each of the separate body parts until your entire body is comfortably relaxed.
2. Inhaling deeply through the nose, filling the stomach and chest, then exhaling slowly. Repeating this deep breathing in unison while teacher counts aloud.
3. Sitting or lying quietly and listening to your breathing; touching your fingers lightly to wrist or neck to feel your pulse. Understand the rhythm of your body.

Although few classrooms in America practice the centering techniques and breathing exercises in conjunction with academic instruction, these holistic methods have been incorporated into classroom experiences via one very unusual teaching approach: the Lozanov method. We turn now to this approach, first developed in Bulgaria, which has found adherents and classroom practitioners in America.

The Lozanov Method

Georgi Lozanov, a medical doctor from Sofia, Bulgaria, is most known for his work in the area of memory and learning. For political reasons Bulgaria was closed to Westerners until the mid 1960's. Therefore, it was not until the 1970's that the specific details of what has come to be known as the Lozanov method of teaching were disseminated in America (Ostrander and Schroeder, 1979). Lozanov contends that we utilize only about 10% of the brain's capacity and that training in intense concentration can result in super learning achievements. Once the mind is freed from all distractions, by the aid of ex-

ternal suggestion, and forced to concentrate, enormous amounts of information can be absorbed in a brief time.

Lozanov was himself a student of Raja (royal or mental) Yoga for 20 years. He became particularly interested in the mental feats of certain yogis who had committed to memory thousands of pages of sacred texts by applying altered states of consciousness to learning tasks. Lozanov codified these techniques into a science of concentration which he labeled suggestology. The goal of suggestology for learning situations, as with other holistic approaches, is to place the student in as relaxed a state as possible (nearly meditative) prior to learning: muscle tension relaxed, heart beat and pulse slowed, blood pressure drops slightly and alpha waves increase. To facilitate this total calming of the mind and body rhythms, Lozanov used deep breathing exercises and classical Baroque music. The latter was selected for its slow, methodical cadence (60 beats per minute) to be synchronized with internal bodily rhythms. The material to be learned (spoken by a trained instructor) is also broken down into brief segments corresponding to the same rhythm. Once in the relaxed state, subjects simply listen to the information, repeated by the instructor, while the music plays softly in the background. The success of this approach builds on a unique psychophysical paradox: the body is relaxed while the mind is acutely alert.

In America today, the Lozanov method is taught under the auspices of the Iowa-based center for Suggestive-Accelerative Learning and Teaching (S.A.L.T.). The S.A.L.T. approach combines music, drama, physical exercises and mental relaxation techniques as a way of pre-learning preparation. Teachers trained in S.A.L.T. stress student motivation and positive expectation for learning achievement and visual imagery of material to be learned. This approach seeks to operationalize Robert Rosenthal's (1968) early concept

of the self-fulfilling prophecy, through relaxation and then intensive instruction in an atmosphere of positive expectation. To further clarify the S.A.L.T. approach, two learning experiments shall now be briefly described.

In 1974 DeKalb County, Georgia agreed to incorporate the Lozanov approach into their public schools. One experiment concerned itself with remedial reading instruction for specific learning disabled and educably mentally retarded children ages 7 to 13 (Pritchard and Taylor, 1976). During the first two weeks of the study the children were taught deep breathing, relaxation exercises, and visualized images described by their teachers. Over the next twelve weeks, daily learning sessions were divided into a passive and active phase. In the passive phase students lay on the floor, with eyes closed, while Baroque music played softly in the background. To enhance relaxation the students were instructed to take three long breaths while the teacher counted backwards from ten. Positive statements for learning were made about each student. Once relaxed the teacher then read aloud in time to the 4/4 cadence of the music from the material to be learned that day (selections from a Barnell-Loft series). New vocabulary words were also introduced during this passive phase.

Another unique aspect of the Lozanov method, aside from the background music, is the use of varying intonation patterns for emphasis. For example, in teaching the new vocabulary words the following pattern was used: first the word was pronounced, then spelled, and finally used in a sentence. Then it was repronounced three times using various intonations: normal declarative tone, soft whisper, loud dramatic voice.

During the active phase of the lesson each student read aloud from the story previously listened to. Word games using the new vocabulary terms were played. Also small groups acted out portions of the story. During the oral

reading phase the teacher corrected any errors made and conducted through questioning a comprehension check.

An analysis of the gain scores from a pretest-posttest design using the Spache Oral Reading, Spache Silent Reading, and Spache Word Recognition subtests revealed the following: 16 of 20 students gained a year or more in oral reading; 15 of 20 students gained a year or more in silent reading; 9 of 20 gained a year or more in word recognition. Considering the subjects of this study were all classified as either learning disabled or educably mentally retarded, these gain scores are impressive. Equally important was the success of this method in the affective area: students were relaxed, comfortable in the learning situation and expressed positive beliefs in their achievement abilities. Nevertheless, the experimenters noted that not every child was able to master the relaxation techniques which are generally more difficult for children to attain than adults.

A second learning experiment involving the S.A.L.T. techniques and reading instruction was conducted in central Iowa with fifth-grade children. The goal of this experiment was to enhance the memory skills of children through an emphasis on visual imagery and relaxation. The importance of the ability to form a mental image of material read has long been cited by Ruth Strang and others as crucial for the development of long term memory skills. Thirty-one students in a single fifth grade class were instructed using the following five step modified Lozanov technique:

1. Physical exercises to first tense, then relax the separate muscles of the body.
2. Music (Baroque) to calm the mind while children were instructed to close their eyes and visualize a "calm/safe place."
3. Lesson preparation in which the positive achievement strengths of

each child was mentioned (ex. "I do remember"), followed by teacher introduction of the story and presentation of new vocabulary words.

4. Silent reading by students followed by oral reading and completion of workbook comprehension activities.
5. Music to relax students while teacher summarized important grammatical concepts, vocabulary terms, and then read aloud from the story while children mentally visualized the sequence of events.

(Pritchard, Schuster, Gensch, 1980, p. 54)

Using the California Achievement tests in reading comprehension and vocabulary, a majority of the students made significant gains from the pre to post tests. Unfortunately, no control group was used in this experiment for a comparison of results. Nevertheless the results, especially in the affective area, as expressed by teachers and students alike, showed that relaxation exercises prior to lesson learning and mind calming music during the lesson do have a positive potential role to play in the classroom.

Biofeedback, Yoga, and the Lozanov method are three approaches to learning which can be characterized as holistic. Individually and collectively they have been used successfully to teach reading and other subject areas. In the affective area these holistic approaches have enabled children to feel more comfortable, relaxed and positive about their school experiences. Today public school teachers in Georgia, Iowa, Colorado and other states have been trained in these techniques and are using them in their classroom to help students learn more efficiently. Through physical relaxation, mental concentration and belief in one's own expanded mental powers, holistic education seeks to become the potential learning force of the future.

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